## CLAIMS

(54)

1. A process for hydrogenating an organic compound, which process comprises bringing the organic compound into contact, under hydrogenation conditions, with a source of hydrogen in the presence of a catalyst comprising one or more catalytically active metal sites located on a catalyst support and recovering the hydrogenation products, wherein at least one of the catalytically active metal sites has been obtained via the partial decomposition on the support of a complex of the metal and a nitrogen-containing organic compound selected from (i) amino acids and (ii) compounds containing both an amino group and an alcohol group, partial decomposition having been carried out such that new vibration bands appear in the infra red spectrum of the complex at between 2100-2200 $cm^{-1}$.

2. The process as claimed in claim 1 wherein the organic compound that is hydrogenated comprises one or more unsaturated organic compounds.

3. The process as claimed in claim 2 wherein the unsaturated organic compounds comprise one or more benzenepolycarboxylic acids or one or more derivatives thereof, or a mixture of one or more benzenepolycarboxylic acids with one or more derivatives thereof.

4. The process as claimed in claim 3 wherein the benzenepolycarboxylic acid is selected from the group consisting of phthalic acid, terephthalic acid, isophthalic acid, trimellitic acid, trimesic acid, hemimellitic acid and pyromellitic acid and mixtures of two or more thereof.

5. The process as claimed in claim 3 wherein the benzenepolycarboxylic acid derivatives are selected from the group consisting of monoalkyl

and dialkyl esters of phthalic acid, terephthalic acid and isophthalic acid, monoalkyl, dialkyl and trialkyl esters of trimellitic acid, trimesic acid and hemimellitic acid, monoalkyl, dialkyl, trialkyl and tetraalkyl esters of pyromellitic acid, where the alkyl groups can be linear or branched and each have from 3 to 18 carbon atoms, anhydrides of phthalic acid, trimellitic acid and hemimellitic acid, pyromellitic dianhydride and mixtures of two or more thereof.

6. The process as claimed in any one of the preceding claims wherein the process is carried out at a pressure of 25 to 300 bar.

7. The process as claimed in claim 6 wherein the process is carried out at a pressure of 50 to 220 bar.

8. The process as claimed in any one of the preceding claims wherein the partial decomposition is undertaken under hydrogen.

9. The process as claimed in any one of claims 1 to 7 wherein after partial decomposition the partially decomposed organic metal complex is treated with a source of hydrogen.

10. The process as claimed in any one of the preceding claims wherein the nitrogen-containing organic compound is an aliphatic amine containing one or more hydroxyl groups.

11. The process as claimed in claim 10 wherein the amine comprises an hydroxyalkyl group.

12. The process as claimed in claim 11 wherein the hydroxyalkyl group is $C_1$ -$C_{50}$ -hydroxyalkyl.

13. The process as claimed in claim 12 wherein the hydroxyalkyl group is $C_1$ -$C_8$ -hydroxyalkyl.

14. The process as claimed in claim 13 wherein the hydroxyalkyl group is $C_1$ -$C_4$ -hydroxyalkyl.

15. The process as claimed in claim 14 wherein the hydroxyalkyl group is selected from: hydroxymethyl, 1-hydroxyethyl, 2-hydroxyethyl, 1-hydroxy-n-propyl, 2-hydroxy-n-propyl, 3-hydroxy-n-propyl and 1-hydroxy-methyl-ethyl.

16. The process as claimed in claim 15 wherein the nitrogen-containing organic compound comprises a mono-, di-, or tri- substituted aliphatic hydroxyalkylamine.

17. The process as claimed in claim 16 wherein the hydroxyalkylamine comprises one or more of: methanolamine, di-methanolamine, tri-methanolamine, ethanolamine, di-ethanolamine, tri-ethanolamine, butanolamine, di-butanolamine, tri-butanolamine, propanolamine, di-propanolamine, and tri-propanolamine.

18. The process according to any one of claims 1 to 9 wherein the amino acid is L-arginine.

19. The process as claimed in any one of claims 1 to 9 wherein the amino acid is selected from all isomers of the following: alanine, arginine, asparagines, aspartic acid, cysteine, cystine, 3, 5-dibromotyrosine, 3, 5, diiodotyrosine, glutamic acid, glutamine, glycine, histidine, hydroxylysine, hydroxyproline, isoleucine, leucine, lysine, methionine, phenylalanine, proline, serine, threonine, thyroxine, tryptophane,

tyrosine and valine.

20. The process as claimed in any one of the preceding claims wherein the partial decomposition is undertaken via calcination or pyrolysis.

21. The process as claimed in claim 20 wherein the calcination temperature is less than the temperature, as determined by TGA in air, at which total weight loss of the organic complex occurs; or the pyrolysis temperature is less than the temperature, as determined by TGA in an inert atmosphere or hydrogen, at which total weight loss of the organic complex occurs.

22. The process as claimed in claim 21 wherein the calcination or pyrolysis temperature is between 200°C and the temperature at which total weight loss of the organic complex occurs.

23. The process as claimed in any one of the preceding claims wherein the total metal dispersion of the hydrogenation catalyst is 45% or more and the metal dispersion relating to a strongly chemisorbed component of the total metal dispersion is 20% or greater.

24. The process as claimed in claim 23 wherein the total metal dispersion is 50% or more.

25. The process as claimed in claim 24 wherein the metal dispersion relating to a strongly chemisorbed component of the total metal dispersion is 30% or greater.

26. The process as claimed in any one of the preceding claims wherein the catalyst support comprises silica.

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27. The process as claimed in claim 26 wherein the silica is amorphous.

28. The process as claimed in any one of the preceding claims wherein the support comprises an ordered mesoporous material and/or a macroporous material.

29. The process as claimed in any one of the preceding claims wherein the support is a material that may be synthesized using an amphiphilic compound as directing agent.

30. The process as claimed in claim 28 wherein the ordered mesoporous material is selected from the group consisting of materials designated as SBA (Santa Barbara) such as SBA-2, SBA-15 and SBA-16, materials designated as FSM (Folding Sheet Mechanism) such as FSM-16 and KSW-2, materials designated as MSU (Michigan State) such as MSU-S and MSU-X, materials designated as TMS or Transition Metal Sieves, materials designated as FMMS or Functionalised Monolayers on Mesoporous Supports or materials designated as APM or Acid Prepared Mesostructure or ordered mesoporous materials designated as M41S.

31. The process as claimed in claim 30 wherein ordered mesoporous material designated as M41S is selected from the group consisting of MCM-41, MCM-48 and MCM-50. .

32. The process as claimed in claim 31 wherein the ordered mesoporous material is MCM-41.

33. The process as claimed in any one of the preceding claims wherein the catalyst support comprises one or more mixed porosity materials.

34. The process as claimed in claim 33 wherein the mixed porosity material contains mesopores and macropores.

35. The process as claimed in any one of the preceding claims wherein the one or more catalytically active metals are selected from transition group VIII of the Periodic Table.

36. The process as claimed in claim 35 wherein the one or more catalytically active metals includes platinum, rhodium, palladium, cobalt, nickel or ruthenium or a mixture of two or more thereof.

37. The process as claimed in claim 36 wherein the catalytically active metal is ruthenium or nickel.

38. The process as claimed in any one of the preceding claims wherein one or more of the catalytically active metals comprises one or more metals of transition group Ib or VIIb or group VIIIb of the Periodic Table.